



UNITED STATES
ENVIRONMENTAL PROTECTION AGENCY
REGION V

1 NORTH WACKER DRIVE
CHICAGO, ILLINOIS 60606

August 21, 1973

Special Delivery
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STATE OF INDIANA
STREAM POLLUTION CONTROL
BOARD

Mr. Oral H. Hert, Technical Secretary
Indiana Stream Pollution Control Board
1330 West Michigan Street
Indianapolis, Indiana 46202

ATTENTION: Sam Moore

E. I. du Pont de Nemours and Co.
Application No. IN 070 0X3 2 720889

Dear Mr. Hert:

Enclosed for your review and comment is a copy of the proposed National Pollutant Discharge Elimination System (NPDES) draft permit we plan to process for the above referenced discharger. The draft conditions have been based on a consent decree entered into in November 1972, and we have informally reviewed the draft conditions with members of your staff. Please note that your office has disagreed with the ammonia limitation included in this draft. We are willing to adjust this value if an alternate limit can be provided which will protect water quality.

We have been requested by Washington to close out all former enforcement actions as soon as possible. Consequently, although we realize that this company is located in a 303(e) planning area, we are requesting your cooperation in expeditiously reviewing this draft permit. We plan to issue a joint public notice after receiving your comments on the enclosed materials.

We would expect to receive your Section 401 certification within thirty (30) days after the public notice period expires unless a public hearing is held. If a public hearing is held, the State Certification would be expected within thirty (30) days after the public hearing. You may, of course, certify earlier if you wish or deny certification or waive as you deem appropriate.

EPA Region 5 Records Ctr.



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If you should have any questions on the enclosed materials, please contact Glenn D. Pratt, telephone number 312-353-7767. Your cooperation in this matter is essential and very much appreciated.

Very truly yours,

A handwritten signature in cursive script, reading "A. H. Manzardo".

A. H. Manzardo
Chief, Permit Branch

Enclosures
As stated

BRIEFING MEMO

E.I. du Pont de Nemours and Company
Industrial Chemicals Department
5215 Kennedy Avenue
East Chicago, Indiana 19898
Permit Application # IN 070 OX3 2 720889

Introduction

A. General Operations

The E.I. du Pont de Nemours and Company plant in East Chicago, Indiana, produces a variety of primarily inorganic chemicals. The facility employs approximately 400 people and operates on a 21 shift-a-week basis.

Figure I gives a rough breakdown of the various chemicals produced and the major raw materials involved in the manufacture of each. Production figures are confidential. As can be seen, raw materials consist primarily of acids, alkalies, and forms of oxidized nitrogen compounds, especially ammonia.

Water usage is 14.4 MGD. Of this, 2.0 MGD is purchased from the City of Hammond, while the other 12.4 MGD comes from the Grand Calumet River.

B. Present Water Discharge

With the exception of sanitary sewage and a small amount of evaporation and consumption, all effluent water is discharged to the Grand Calumet River.

At the time of original application, ten outfalls were functional. Figure II shows the relative locations of the outfalls, and indicates the area of the plant handled by each. Figure III describes the constitution of each effluent.

Figure IV is a listing of individual and total effluent parameters. The numbers in the figure were taken from the original application. The most important parameters are total dissolved solids, suspended solids, ammonia, sulfates, and zinc.

On March 2, 1973, duPont submitted an upgraded version of Figure IV. Figure V shows this newer version. The primary difference between the upgraded version and the data taken from the original application is the diminution of zinc discharge brought about by the closing of outfall #006.

Figure VI represents data submitted by du Pont on the analysis of cooling water additives. All analyses are self-explanatory except the last item called "mud remover". This material is non-biodegradeable polyelectrolyte, non-toxic and non-cumulative.

C. Aspects of the Grand Calumet River

The Grand Calumet River begins in Gary, Indiana, and flows predominately west toward Illinois. In East Chicago, Indiana, the river splits. The Indiana Harbor Canal flows north through East Chicago to Lake Michigan, while the remainder of the river continues west to the O'Brien locks and Lake Calumet and/or westerly into Illinois.

The State of Indiana has adopted water quality standards for the Grand Calumet River within Indiana (Indiana Rule SPC 7-R). Figure VII lists the limited parameters as set down in the regulations.

Figure VIII gives the maximum allowable mass loadings the river can carry, using the limits of SPC 7-R and an assumed flow of 800 cfs.

In Figure IX, the maximum allowable mass loadings for the Grand Calumet River (using a basis as described in the previous paragraph) are compared with the du Pont effluent loadings. Results are expressed as the percentage of the total maximum allowable load contributed by du Pont. The du Pont effluent exerts a significant loading percentage of ammonia, total dissolved solids, sulfate, chloride, and phosphate.

D. The du Pont Consent Decree

On November 14, 1972, as a result of civil suit, du Pont entered into a consent decree stipulating certain schedules for construction, research, and effluent loading reduction.

Figure X lists the chemical limitations to be met by du Pont by the dates specified (See explanation of Figure XI).

Figure XI cites the consent decree section calling for consolidation of outfall structures. According to the decree, application for such work had to be filed with the U.S. Corps of Engineers by December 1, 1972. The decree stipulated that the work was to be completed by September 15, 1973, with the exception that if the permit for construction was not granted by the Corps by April 1, 1973, the date for completion of the consolidation would be moved back 5 1/2 months, with a resultant required completion date of December 18, 1973.

The Corps of Engineers did not issue the necessary permit until June 11, 1973, so that the later date for completion of the structures became effective.

The delay in permit issuance also resulted in the date for attainment of the numbers shown in Figure X to be moved from the original September 15, 1973 date, to December 18, 1973, as per Section IV (c) of the decree.

Figure XI cites the decree section requiring du Pont to remove accumulated sludge deposits from the river. The necessary permits for this action have not yet been granted, although their issuance is near (see Special Conditions).

Figure XII shows the necessary plans which must be formulated for control of total dissolved solids, sulfate, and chloride, and the procedures for approval of these plans.

Figure X illustrates the relationship between the present du Pont effluent and the consent decree limitations.

E. Present Waste Abatement

With the exception of the items listed in Figure XIII, consisting primarily of equalization and neutralization, and with the further exception of certain special pump seals, little if any treatment is given to the present effluent.

Special Conditions

A. Initial Effluent Limitations

Figures cited in initial effluent limitations represent current discharges as listed by du Pont on March 2, 1973.

Monitoring is to be done weekly until February 16, 1974, at which time the consent decree provision IV (f) comes into effect.

All parameters monitored are in the consent decree except ammonia. Because of the magnitude of the ammonia discharge, and because ammonia is listed in Grand Calumet River water quality criteria, it will be limited and monitored.

Limitation of pH in the consent decree is based upon hourly averages. In the permit, pH values are maxima and minima. This is the only change in specifications from the consent decree.

B. Interim Effluent Limitations

Interim limitations are the same as those in the consent decree, with the exception of ammonia and pH as described above.

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to this
SLM*

Ammonia is to be limited by October 15, 1974. Limitation is based on a total ammonia discharge of 1.5 mg/l in a total process flow of 3.5 MGD. The 1.5 mg/l figure was chosen for three reasons. First, the Indiana water quality standard for the Grand Calumet River requires the maximum concentration of ammonia in the river to be not greater than 1.5 mg/l. Since, at present, the ammonia level in the river is above 1.5 mg/l, no discharge can contain a higher concentration, since that would result in even greater violation of the ammonia standard.

Secondly, the 1.5 mg/l level specified for ammonia can be met using present proven technology. Lastly, the 1.5 mg/l ammonia figure is being applied to all dischargers along the upstream segment of the Grand Calumet River, so that all parties will be treated equally.

C. Final Effluent Limitations

Final effluent limitations are as stated in the consent decree with the exception of ammonia. Ammonia restrictions were explained above.

D. Other Restrictions

Compliance with construction of outfalls and dredging of accumulated solids is called for as in the consent decree.

Provision is also made for upgrading the permit when load allocations for the Grand Calumet River are established by the State of Indiana at a later date.

Consent decree sections calling for adoption of control technology to limit dissolved solids, sulfate, and chloride are also cited.

E. Compliance Schedule

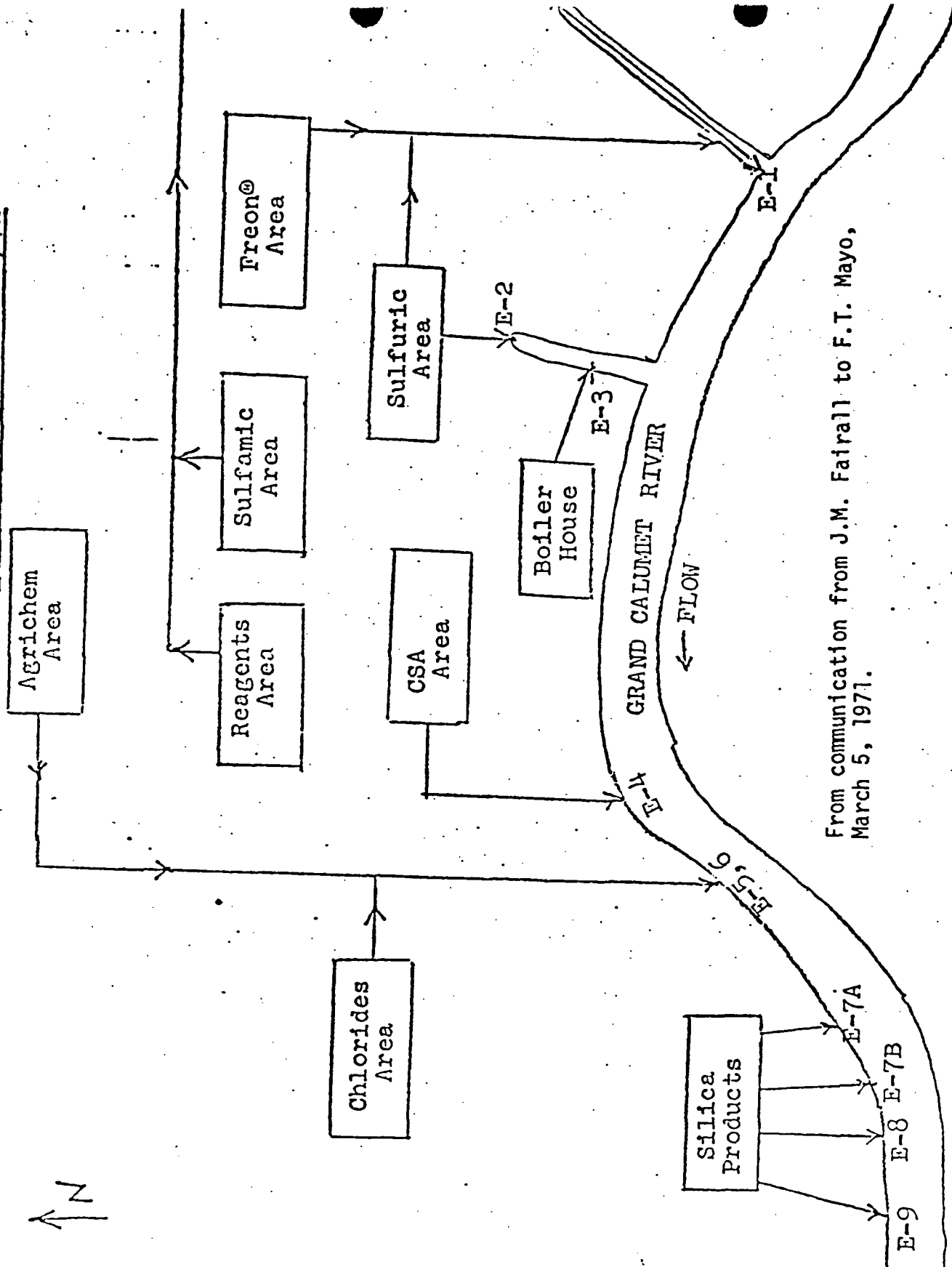
The compliance schedule specified corresponds to consent decree dates. In addition, interim reporting is called for to check on the progress of steps to meet monitoring requirements.

F. Expiration of the Permit

The permit shall expire on June 30, 1977. This is six months after the last specified date for attainment of effluent reductions. Six months will allow sufficient time for generation of data on new waste abatement systems, and will allow the discharge to be evaluated to see if it meets "A" guideline established between the time of permit issuance and expiration.

Dennis L. Hatfield

20 FOOT 5 EAST CHICAGO PLANT OUTFALLS INTO GRAND CALUMET RIVER - 1/71



From communication from J.M. Fairall to F.T. Mayo,
March 5, 1971.

Outfall 1

per original application)

<u>Outfall #</u>	<u>Flow</u>	<u>Description</u>
001	1040 gpm (1.5 MGD)	Used for production of fluoro-carbons, sulfuric acid, sulfamic acid, and reagent-grade chemicals
002	7065 gpm (10.2 MGD)	Cooling water for sulfuric acid plant
003	60 gpm (0.09 MGD)	Spent (neutralized) acid from ion exchange resins
004	15 gpm (0.02 MGD)	Boiler blowdown
005	55 gpm (0.08 MGD)	Manufacture of chlorosulfonic acid
006	≈175 gpm (0.25 MGD)	Manufacture of aluminum chloride and agricultural chemicals
007	109 gpm (0.16 MGD)	Manufacture of silica products - esp., sodium metasilicate process water
008	104 gpm (0.15 MGD)	Manufacture of silica products - esp., colloidal silica concentration stage wastes
009	1160 gpm (1.67 MGD)	Manufacture of silica products - esp., colloidal silica ion exchanger neutralization wastes
010	42 gpm (0.06 MGD)	Manufacture of silica products - colloidal silica filtrate stream

Figure IV

(all data in #/day)

du Pont Effluent - from Permit Application

Outfall #	pH	T(s)	BOD	TDS	SS	NH ₃
1	5.0	79	-	20600	500	1240
2	3.2	92	-	13500	-	-
3	6.1	79	-	2420	-	-
4	11.2	-	-	90	-	-
5	2.1	74	-	900	-	-
6	6.5	79	100	1060	30	-
7	10.0	108	-	870	410	-
8	9.9	103	-	2470	320	-
9	6.3	79	-	45500	75	-
10	10.1	92	-	2470	220	-

Total			100	89880	1555	1240
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Outfall #	P	kN	SO ₄	Cl	Zn	Cr
1	13	2090	7680	4100	100	5
2	-	-	13500	-	-	-
3	-	-	1710	-	-	-
4	13	-	15	-	-	-
5	-	-	300	600	3	-
6	-	-	510	300	50	-
7	-	-	21	-	-	-
8	-	-	300	-	-	-
9	-	-	30300	-	-	-
10	-	-	60	-	-	-

Total	20	2090	54396	5000	153	5
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Note - All in #/day

Figure IV (cont'd)

Effluent From Permit Application

Outfall #	TVS	COD	F	TH	Acidity
1	9700	160	24	4730	2700
2	-	-	-	-	6000
3	60	-	-	-	210
4	12	3	-	-	-
5	55	24	-	-	1100
6	-	12	-	-	-
7	70	20	-	-	-
8	370	13	-	-	-
9	1270	-	-	15,000	450
10	270	13	-	-	-

Total	11807	245	24	19,730	10,460
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Outfall #	Ca	Mg	Pb	Al	Alk	Fe(+)
1	1840	70	-	-	-	-
2	-	-	-	-	-	-
3	-	-	-	-	-	-
4	-	-	-	-	-	-
5	-	-	0.08	-	-	-
6	-	-	-	1	-	-
7	-	-	-	-	355	2.2
8	-	-	-	-	1570	1.5
9	6000	70	-	-	-	-
10	-	-	-	-	410	-

Total	7840	140	0.08	1	2335	3.7
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Outfall	Sulfamate	Na	SiO ₂	Flow, MGD
1	3300	220	-	1.49
2	-	-	-	10.20
3	-	160	-	.09
4	-	36	-	.02
5	-	260	-	.08
6	-	350	-	.29
7	-	-	-	.16
8	-	820	1050	.15
9	-	7000	-	1.67
10	-	520	1700	.06

Total	3300	9366	2750	14.21
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Figure V

ALL VALUES IN ANNUAL AVERAGE IN NET POUNDS PER DAY EXCEPT pH

Discharge Serial Number	pH	BOD	COD	TDS	TSS	NH3 as N	SO4	Cl	Zinc	Other
001	5.0	100	170	21700		1240	13500	4100	100	Sulfamate 3300; P-7
002	3.2	-	-	13500	-	-	13500	-	-	-
003	6.1	-	-	2420	-	-	1710	-	-	-
004	11.2	-	3	90	-	-	15	-	-	P-13
005	2.1	-	24	900	-	-	300	600	3	siduron & linuron are seasonally produced
006*	-	-	-	-	-	-	-	-	-	-
007	10.0	-	20	870	410	-	21	-	-	Fe-2.2
008	9.9	-	13	2470	320	-	300	-	-	Silicate-1050
009	6.3	-	-	45500	75	-	30300	-	-	-
010	10.1	-	13	2470	220	-	60	-	-	Silica (SiO2) -1700
Totals	-	100	243	89920	1555	1240	53886	4700	103	

*Discharges from 006 have been discontinued,

From communication from J.T. Sixsmith (E.I. du Pont) to Sam Moore (Indiana Board of Health, now of Indiana SPCB), March 2, 1973.

Figure VI

ANALYSIS OF COOLING WATER ADDITIVES USED AT THE PREMISES
AND THE AVERAGE WEEKLY AMOUNTS USED

<u>Cooling Water Additive</u>	<u>Amount Used</u>	
"Nalco 360" - Cooling System Corrosion Inhibitor	80 lbs.	51% CrO ₄ 6.7% Zn 1.8% PO ₄ Balance "non-active molecules"
"Nalco 427" - Micro-organism control chemical	5 lbs. during the months of July, August and September, none during the other nine months	10% methylene bithiocyanate, 90% inerts
Hydrochloric Acid	27 gallons	35% HCl
"Zimmite ZM-100" - Mud Remover	7 lbs.	In response to Du Pont's request to the Zimmite Corp., the manufacturer of the product, for information as to the composition of the product, Zimmite Corp. replied that such information is proprietary, but advised that it contained "a high molecular weight polyacrylamide (approximately 8 million molecular weight) and sodium sulfate exclusively."

From communication from E.W. Schall (du Pont) to W.D. Ruckelshaus (U.S. EPA, former), January 26, 1973.

Figure VII

State of Indiana Water Quality Criteria
for the Grand Calumet River
as per Indiana Rule SPC-7-R

SPC-7R-2

<u>Parameter</u>	<u>Limitation</u>
Settleable Solids	0
Floating Matter	Shall not be present in amounts sufficient to be unsightly or deleterious
Substances not on the toxic materials list	Shall not be present in concentrations or combinations which are toxic or harmful to human, animal, plant, or aquatic life
Dissolved oxygen	Average of 3.0 mg/l in any 24 hr. period, greater than 2.0 mg/l at any time
pH	6.5 - 8.5
Temperature	90°F at all times (60°F Winter)
Fecal coliform	Shall not exceed a geometric mean of 1000/100 ml, nor exceed 2000/100 ml in more than 10% of the samples, except during periods of storm water runoff
Total Dissolved Solids	275 mg/l maximum and average
Ammonia	1.5 mg/l maximum at any time
Chloride	35.0 mg/l maximum at any time
Cyanide	0.1 mg/l maximum at any time
Fluoride	1.3 mg/l maximum at any time
Iron (dis)	0.3 mg/l maximum at any time
Mercury (t)	0.005 mg/l maximum at any time
Phenolics	0.01 mg/l maximum at any time
Sulfate	75.0 mg/l maximum at any time
Phosphate (t)	0.1 mg/l maximum at any time
BOD ₅	10.0 mg/l maximum at any time
Oil	5.0 mg/l maximum at any time
Toxic Materials	Maximum of 1/10 the TL _m (96)
Other Materials	Shall not produce color, odor, or other conditions in such degree as to create a nuisance
Trace contaminants and radionuclides	Shall not be present in such concentrations as to prevent meeting 1962 PHS drinking water standards after conventional treatment

Figure VIII

Water Quality Criteria for the Grand Calumet River

At a flow of 800 cfs, the following #/day of the indicated parameters are contained in the river to equal Water Quality Limits as established by Indiana Rule SPC 7-R:

Parameter	kg/day	#/day
TDS	5.28×10^5	1.16×10^6
NH ₃	2.88×10^3	6.34×10^3
CI	6.71×10^4	1.48×10^5
CN	1.92×10^2	4.23×10^2
F	2.49×10^3	5.49×10^3
Fe (dis)	5.76×10^2	1.26×10^3
Hg (+)	9.60	21.2
Phenolics	19.2	4.23×10^1
SO ₄	1.44×10^5	3.17×10^5
PO ₄	1.92×10^2	4.23×10^2
BOD ₅	1.92×10^4	4.23×10^4
Oil (em. or dis)	9.60×10^3	2.12×10^4

Figure IX

Contributions to Stream Loadings by du Pont
(loadings as per Figures V, VIII)

Parameter	Allowable total loading (#)	du Pont loading (#)	% of allowable total loading attributable to du Pont
Total dissolved solids	1.16×10^6	8.99×10^4	7.8
Ammonia	6.34×10^3	1.24×10^3	19.6
Chloride	1.48×10^5	5.00×10^3	3.4
Cyanide	4.23×10^2	0	0
Fluoride	5.49×10^3	2.40×10^1	0.4
Iron (dis)	1.26×10^3	3.7×10^0 (max)	0.3
Mercury (t)	2.12×10^1	0	0
Phenolics	4.23×10^1	0	0
Sulfate	3.17×10^5	5.44×10^4	17.1
Phosphate (t)	4.23×10^2	1.30×10^1	3.1
BOD ₅	4.23×10^4	1.00×10^2	0.2
Oil	2.12×10^4	0	0

Figure X

Consent Decree Limitations - Chemical

Parameter	Level to be met by	Level to be met by	Present effluent ^a	Resultant ^e %Reduction to be achieved
	4/17/74 ^a	10/15/74 ^a		
pH	6.5-9.0	-	2.1-11.2 ^d	NA
Zinc	12 ^b ; 8 ^c	-	153 ^d	94.8
Phosphorus	6 ^b ; 4 ^c	-	20 ^d	80.0
Suspended solids	900 ^b ; 600 ^c	-	1555 ^d	61.3
Chloride	4800 ^b ; 2500 ^c	-	5000 ^d	50.0
Sulfate	-	58,500 ^b ; 39,000 ^c	54,396 ^d	28.2
Total dissolved solids	-	102,000 ^b ; 74,000 ^c	89,880 ^d	0.0
Additives	1/10 of 96 hr. TL _m			

- a) all in #/day
- b) figures are net daily loadings
- c) figures are monthly average net daily loadings
- d) based on original figures
- e) based on monthly averages, using Du Pont figures as monthly averages
- f) percent reductions not specified in consent decree